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3.2 Site Selection and Site Planning

Site selection refers to the choice of a site; *site planning* refers to the laying out of proposed uses within property boundaries. The *siting* of structures on a particular site is a subset of site planning but is addressed in *Section 3.3 – Building Placement and Orientation on a Site*. Both site selection and site planning have a major impact on the relative "greenness" of any Federal facility being planned. Site selection includes such issues as transportation and travel distances for building occupants, impacts on wildlife corridors, and impacts on the hydrology (stormwater flows, wetlands, etc.). Decisions made during site planning will have an impact on the immediate natural community as well as on the energy consumption of buildings and the comfort of their occupants. Thoughtful placement of the building on the site promotes energy conservation by taking advantage of natural site features such as breezes, sunlight, shade, and topography. Good site planning minimizes site-clearing (saving money), and preservation of existing vegetation may provide a low-maintenance landscape that avoids supplemental irrigation and fertilizer. Mature stands of native vegetation often provide the desired energy-conserving shade and wind control that would otherwise require years to develop from expensive new plantings.

Opportunities

Opportunities for creating greener facilities arise throughout the site selection and site planning stages of design. Try to influence the process at the very earliest stages of planning—well before a site is selected, if possible. If a site is already selected, find out what is there and try to influence both the overall site planning and the siting of specific buildings and other facilities. Site planning and building siting should be considered part of the overall building design, particularly as related to cooling-load avoidance, natural daylighting, passive solar heating, and natural ventilation.

Technical Information

SITE SELECTION

Select sites that reduce occupants' dependence on automobiles. Developing an inner-city site with ready access to light rail, for example, instead of a suburban "greenfield" site can dramatically reduce the overall environmental burdens of a facility, including the impacts of a facility's operation as well as the impacts of getting workers to and from the facility.

Avoid development that will interrupt wildlife corridors or break up contiguous natural areas. Loss of wildlife habitat is one of the most significant—and challenging—impacts of development today.

Pay attention to cultural and agricultural resources when choosing a site and avoid disruption whenever possible.

SITE PLANNING AND FACILITY SITING

Site inventory surveys should be thorough and objective and include the following: geology, topography, orientation and slope aspect, soils, hydrology, vegetation, and wildlife habitat. All structures and physical construction on the site should be mapped and all prior uses noted. Vegetation surveys should show the location and character of all vegetation communities as well as important individual trees. Soil analysis based on random sampling should report soil type, soil pH, total soluble salts, and infiltration rate. Soil texture, percentage of organic matter, and water-holding capacity should also be determined. County agricultural extension offices can perform these analyses for a modest fee.

Proximity of trees to structures and constructed features should take into account the type of trees (deciduous vs. coniferous, for example), growth rate, life span, and ultimate canopy shape—all of which can influence both shading and solar/daylighting access. When existing tree stands are too dense, selective thinning and lifting the canopy will improve air movement, enhance ground-level vistas, and provide remaining trees with room to more fully develop. If possible, consult an arborist.

Preserve high-quality habitat. Strive for large contiguous natural areas that are connected by wildlife corridors. Size of habitat and corridor requirements vary widely by region and any species of particular concern. For details of habitat protection and corridor design, contact the local office of the state's natural resources department or the regional office of the U.S. Fish and Wildlife Service.

Channel development into areas that have already been disturbed. Existing infrastructure, facilities, and cleared areas should be preferentially used, resulting in lower development costs and leaving less-disturbed areas intact. On damaged sites, ecological restoration can become part of the development plan: revegetation, wetlands restoration, invasive species removal, and habitat reconstruction can both help the environment and foster a positive public image in the community.

Photo: Warren Gretz

Careful use of trees around buildings, such as at this Lakewood, Colorado, municipal center, can reduce energy use by blocking unwanted solar gain.

Significant wetlands and significant uplands should be protected through careful site planning. While wetlands are designated differently by various regulatory authorities, this variability does not diminish the ecological importance of protecting and enhancing these natural features. Uplands affect wetlands and require their own forms of protection.

Buffers should be retained along wetlands, erosion-prone slopes, and other fragile areas or locations of special ecological importance.

Natural drainage systems should be used and preserved wherever possible. Site buildings, roadways, and parking so that water flowing off the developed site during extreme storm events will not cause environmental damage (see *Section 3.5 – Stormwater Management*). Also consider how drainage systems will be affected *during* construction, and avoid sites where impacts will be excessive.

Desirable locations for driveways and parking are generally on south-facing slopes or the south sides of buildings in snowy climates, and on the east or north sides of buildings in southern climates—the latter reducing heat buildup during hot afternoons (existing or newly planted shade trees can cool these surfaces). These needs must be balanced with other priorities, however; there are often more important considerations.

A "wind rose" is a diagram of annual wind directions and velocity for a particular region. It is useful for plotting information on winds in order to provide natural shielding from adverse winds and to utilize favorable winds for passive cooling. Regional wind rose information is usually available from the nearest airport, reference library, or county agricultural extension office.

References

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